**A 15 GeV Electron Accelerator for Europe**

J. Arvieux of the Laboratoire National Saturne, Saclay, France, describes a new European facility for nuclear physics.

The schematic layout of the three-pass recirculating LINAC being proposed as a future 15-20 GeV electron accelerator for nuclear physics. Two long, straight sections (LSS) are matched by matching sections (MATCH) to arc sections coupled to recombination (REC) and spreader (SPRE) sections that lead to and from a 1 km long LINAC.

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The project for a 15-30 GeV European Electron Accelerator is gaining momentum after the publication in 1991 of the Nuclear Physics European Collaboration Committee (NuPECC) report *Nuclear Physics in Europe: Opportunities and Perspectives* on future facilities and instrumentation (see also *EN* 21 (1990) 111). The report assessed six sub-fields where Europe plays an important, if not dominant, role. Among the recommendations, the one concerned with studies using high energy electron probes stand out by its clarity: “NuPECC recommends that a major initiative be launched now to develop a proposal for a European CW (continuous wave) electron accelerator in the 15 GeV region”.

The physics case for such a facility has been discussed at numerous conferences and workshops (Seillac (1988), Dourdan (1990), Amsterdam 1991), Penn State, USA (1992)). Summarising in a few words, its goal will be to study QCD in its perturbative (including non-leading order effects) and non-perturbative aspects. One hopes to understand the basic and opposing phenomena of confinement (when quarks stick together in a physical hadron) and hadronization (when quarks escape from it). In particular, one would like to confirm colour transparency where due to the uncertainty principle only small size quark configurations can be excited in a nucleus at large momentum transfer. These configurations have a lifetime of the order of 1 femtoseconds per (GeV/c)^2 transferred so they evolve back to normal hadrons after only a few femtoseconds. Using a nucleus as a laboratory whose size, mass and density can be adjusted is one, and maybe the only, way to characterise them.

The choice of an initial energy of 15 GeV allows the study of charm production (J/psi and associated charm) at sizable cross-sections — a regime of special interest since the large mass of charmed hadrons allows detailed QCD predictions. Studies of J/psi production in nuclei are of particular interest since the large mass of charmed hadrons allows detailed QCD predictions. When quarks stick together in a physical hadron and hadronization (when quarks escape from it). In particular, one would like to confirm colour transparency where due to the uncertainty principle only small size quark configurations can be excited in a nucleus at large momentum transfer. These configurations have a lifetime of the order of 1 femtoseconds per (GeV/c)^2 transferred so they evolve back to normal hadrons after only a few femtoseconds. Using a nucleus as a laboratory whose size, mass and density can be adjusted is one, and maybe the only, way to characterise them.

The energy resolution has been chosen to be of the order of \( \frac{\Delta E}{E} = 3 \times 10^{-4} \) FWHM at 15 GeV. The machine is designed in such a way that an eventual upgrade to 30 GeV will not require the construction of a new machine but only upgrading of the RF system and the magnet power supplies. Since the energy resolution is essentially determined by synchrotron radiation losses in the recirculating arcs, the size of the machine is approximately the same for 15 and 30 GeV. If one accepts a limitation of the energy resolution of 10^−3 at 30 GeV (which would still allow meson production to be separated from inelastic nuclear reactions). The success of the project will largely depend on the commitment of a sizeable part of the European nuclear physics community. All contributions are welcome and the persons interested in receiving further information should contact the Chairman or a member of the ESC (see below).

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**European Electron Accelerator Project**

**EUROPEAN STEERING COMMITTEE**

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